University of Toronto at Mississauga
Date: 19th December, 2005

Course: Economics 380
Instructor: Simon Board
Duration: 2 hours
Aids: books, notes, calculators.
Total marks: 200

It is an academic offence for students to possess the following items at their examination desks: cell phones, pagers, personal digital assistants or wristwatch computers. If any of these items are in your possession, put them with your belongings at the front of the room before the examination begins. No penalty will be imposed. Please note, students are not allowed to petition to rewrite a final examination.

All question are worth 25 points. Good luck!

1. A McDonald's in Michigan allows students to stay on the clock one hour after their shift ends as long as they spend the time doing schoolwork. What effect will this have in profits in the short term (while current workers have their job)? What effect will this have on profits in the long term (when workers change)?

2. A study in Washington DC looked at the types of cars that most frequently ran stop signs. In the sample, Volvos were heavily over represented. This seems initially surprising since Volvo owners are typically middle class couples with children.
(a) Can moral hazard explain this regularity?
(b) Can adverse selection (signalling) explain this regularity?

3. Consider the following holdup problem. A seller invests I at cost $c(I) = I^2/2$ which creates value $V(I) = I$ for the buyer.
(a) What is the first–best investment, I^*, that maximises $V(I) - C(I)$? What is the first–best surplus $V(I^*) - C(I^*)$?

Consider the following holdup game: (1) The seller chooses the investment I. (2) After the investment, the buyer chooses a price p and the seller decides whether to sell at this price.
(b) Under this holdup game, what price will the buyer choose? How much investment will the seller voluntarily do?
(c) Consider an infinitely repeated version of the holdup game where all players have discount rate δ. Consider the following strategies: the seller invests the first best level I^*, the buyer offers

a price $p = C(I^*)$ and the seller chooses to sell. If anyone deviates then the agents revert to the Nash equilibrium of the static game (from part (b)). Under what condition on the discount rate is this a subgame perfect equilibrium (i.e. where neither the buyer nor seller wish to defect)?

4. [25] Suppose there is one upstream firm and N downstream firms. The upstream firm sells a good at price p_U to the downstream firms who mark the good up and sell it to final customers.
(a) First suppose there is only one downstream firm. Explain why the price will exceed the monopoly price of a vertically integrated firm.
(b) Suppose there are two downstream firms who are Bertrand competitors. Will the final price exceed the monopoly price for a vertically integrated monopolist?
(c) In the light of these results, what effect will exclusive territories have on prices and the upstream firm's profits?

5. There are two different types of students: high and low ability. Answer the following questions, justifying your reasoning.
(a) As in class, suppose that students wish to maximise their wage minus the the cost of education. Employers pay competitive wages which, in a signalling equilibrium, depend upon the education chosen by the student. (i) If a high ability student has a *lower* cost of education than a low ability student, can a degree act as a signal of ability? (ii) If a high ability student has a *higher* cost of education than a low ability student, can a degree act as a signal of ability?
(b) Suppose that eduction is equally costly for all students, but employers have two types of job: basic and advanced. An employer will only put a student into the advanced job if they are sure the student is of high ability. (i) If a high ability student places a *higher* value on the advanced job than a low ability student, can a degree act as a signal of ability? (i) If a high ability student places a *lower* value on the advanced job than a low ability student, can a degree act as a signal of ability?

6. A firm sells two goods, A and B. This firm can either set two separate prices for the two goods, or set one bundled price. In each of the following cases say whether the firm should bundle or price separately, and what the prices should be.
(a) There are equal numbers of two types of customers, 1 and 2, with valuations

$$\begin{aligned} v_A^1 &= 10 \quad \text{and} \quad v_B^1 = 4 \\ v_A^2 &= 4 \quad \text{and} \quad v_B^2 = 10 \end{aligned}$$

(b) There are equal numbers of three types of customers, {1,2,3}, with valuations

$$\begin{aligned} v_A^1 &= 10 \quad \text{and} \quad v_B^1 = 10 \\ v_A^2 &= 4 \quad \text{and} \quad v_B^2 = 4 \\ v_A^3 &= 10 \quad \text{and} \quad v_B^3 = 4 \end{aligned}$$

(c) There are equal numbers of four types of customers, {1,2,3,4}, with valuations

$$\begin{aligned} v_A^1 &= 10 \quad \text{and} \quad v_B^1 = 10 \\ v_A^2 &= 4 \quad \text{and} \quad v_B^2 = 4 \\ v_A^3 &= 4 \quad \text{and} \quad v_B^3 = 10 \\ v_A^4 &= 10 \quad \text{and} \quad v_B^4 = 4 \end{aligned}$$

7. A restaurant is currently open until midnight. The manager asks you whether they should close earlier. The number of customers arriving during each hour is as follows:

Hour	No. of Customers
8-9	50
9-10	40
10-11	30
11-12	20

Each customer yields an average revenue of \$10. The average cost of food for a meal is \$5. The hourly wage bill is \$120.
(a) Assuming the number of customers arriving per hour does not change if you closed earlier, when chould the restaurant close in order to maximise profits?
(b) Suppose you close at the time recommended in part (a). Do you think the number of customers arriving in earlier hours will necessarily remain the same? Provide a reason why: (i) the calculation in part (a) *underestimates* the profit gain from closing early; and (ii) the calculation in part (a) *overestimates* the profit gain from closing early.

8. An incumbent is trying to choose it's R&D in order to prevent entry. To be concrete, suppose that if entry occurs the two firms then compete in prices.
(a) Suppose R&D reduces the incumbent's costs. Should the incumbent invest more or less in R&D in order to prevent entry? Using the taxonomy of entry strategies, is this a direct or a strategic effect?

(b) Suppose R&D increases the quality of the incumbent's product. Should the incumbent invest more or less in R&D in order to prevent entry? Is this a direct or a strategic effect?